Western Pacific Spotlight Article

Limited Entry in Hawaii's Major Commercial Fisheries

INTRODUCTION

This article discusses the evolution of limited-entry fishing in Hawaii with an emphasis on the economic impacts. Each of Hawaii's Federally managed commercial fisheries is subject to some form of limited entry. Limited entry is seen by fisheries managers and by the fishermen themselves in Hawaii as a significant regulatory measure despite doubts in the professional management literature about the effectiveness of limited entry in terms of controlling fishing effort. The experience in Hawaii suggests that when implemented fairly early in a fishery development process, limited entry can provide the basis for encouraging a sense of community amongst participants who then have a more common stake in management decisions, leading to more rational evolution of subsequent fishery regulations. The same may be true for developed fisheries on the U.S. mainland if a means for reducing the scope of each regulated fishery is found.

Hawaii has four Federally managed commercial fisheries: the Northwestern Hawaiian Islands (NWHI) lobster (spiny and slipper) fishery; NWHI bottomfish (snappers, groupers, and jacks) fisheries; the domestic pelagic longline fishery; and the deep-sea precious coral fishery[1]. Landings and revenues in the first three fisheries are depicted in Figures 1, 2, and 3. Each fishery developed rapidly in the 1980's. The growth of the two NWHI fisheries could not sustain catch rates. The growth of the pelagic longline fishery continues, with the extent of competition from foreign fishing vessels in international waters still unclear.

In the mid-1980's, the Western Pacific Fishery Management Council (hereafter referred to as the Council) began to explore limited entry options for the NWHI lobster and bottomfish fisheries in direct collaboration with vessel operators and owners. These were recently developed fisheries fairly distant from the population centers of Hawaii[2] and were based on a fairly small and narrow bottom topography. The number of commercial fishing vessels in each fishery was small (10-20). However, because the prices of the products were relatively high, the anticipated revenue of participating vessels was substantial, particularly at early catch rates.[3]

Despite the small initial number of participants in the NWHI fisheries, biological overfishing was considered possible if the profits of the early participants attracted substantial numbers of new entrants from already stressed mainland U.S. fisheries (e.g., trap fisheries in the Pacific Northwest). But more importantly for the evolution of limited entry in Hawaii, many participants in both NWHI fisheries realized that with the substantial variable costs in these fisheries[4], economic viability (i.e., maintaining catch rates and thus revenue per day at sea) was an essential fisheries management objective if the benefits of the fishery resource were to be realized over the long run.

[1]The precious coral fishery has not really operated since the implementation of the Magnuson Act in 1976 due to overfishing by foreign fishing fleets in the late 1960's and early 1970's and possible habitat destruction of these slow-growing species. Entry by domestic participants is restricted to experimental fishing permits. Only a few trips have been taken by domestic vessels under the fishery management plan.

[2]The Northwestern Hawaiian Islands (NWHI) are a string of uninhabited islets and reefs running 1,200 n.mi. west of Kauai through Midway Islands and Kure Atoll. The nearest fishery location is about 500 miles from Honolulu.

[3]For example, in 1983 ex-vessel lobster revenue per trap haul was $7.04 (unadjusted for inflation) and revenue per day fishing was $2,100, with frozen lobster tails selling for $7.41 per pound. Similarly, average bottomfish prices were $2.30 per pound (round weight) with prices for prime opakapaka (pink snapper) reaching $25.00 at Christmas and New Year's.

[4]Variable costs include per-trip run times of up to 1 week in each direction and increased annual and per trip maintenance costs associated with the substantial risks involved in breakdowns in isolated locations (several vessels have sunk in the area in recent years). As a result, generating sufficient revenues to cover fixed costs is a major operations problem.

Council management and NMFS economics staff began a series of discussions and scoping meetings with fishermen from all of Hawaii's major commercial fisheries in the mid 1980's. As a result, further efforts were made to implement limited entry for the NWHI bottomfish fishery, which would become the initial test case of limited entry in Hawaii.

Complementing this interest in limited entry, economic studies were conducted on the NWHI fisheries throughout the 1980's and into the 1990's. These studies confirmed the perception that profitability in both fisheries was sufficiently marginal that only a few vessels of moderate size would be likely to make a long-term commitment to the fisheries. Although the NMFS economists and those working for the Council collaborated in a number of areas, the management framework was designed by the Council and its staff, while the NMFS economists served primarily as "objective" sources of economic analysis. This is shown in particular by the NWHI bottomfish limited entry plan.

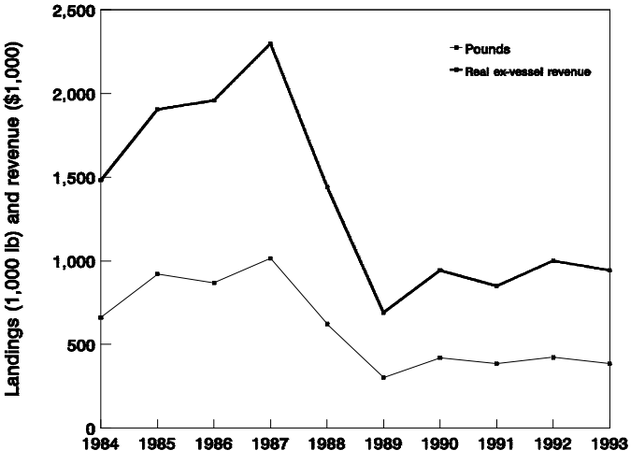

Figure 1
Hawaii bottomfish landings and real ex-vessel revenues.

NWHI Bottomfish Fishery

In the mid-1980's, the Council issued a report suggesting that a limited entry program allowing "satisficing[5]," rather than "optimizing" or "maximizing," behavior would be preferable to the participants of the NWHI bottomfish fishery (Meyer[6]). Despite the "distant-water" aspect of this fishery, participation in it was still viewed as a choice of life-style, with profitability seen as taking second place as an incentive to participate. In contrast with economic theory, and most economic practice in limited entry and other controlled access fisheries (e.g., ITQ's), a key element of the management plan was not monetizing participation in the fishery.

The Council initially approved this plan and set a control date for entry in 1985, but the actual FMP was not implemented until 1989. The basic principles were: to not allow transferability of permits (i.e., forestalling monetization of permits), and to determine the optimum number of vessels in the fishery (and thus new entry) based on average breakeven operating levels, rather than on identifying a target positive rate of profit which might be viewed by economists as economically "efficient." About 35 vessels were vested with rights to permits, and attrition was expected to winnow the number down by a sunset date of 1994.[7] Studies by NMFS economists and fishery monitoring personnel provided the detailed basis for access decisions under the limited entry program (Pooley and Kawamoto[8], Hamilton[9]). This fishery management system remains in effect today.

[5]"Satisficing" is a term created by organizational economists to suggest that people may tend to satisfy their basic wants, rather than trying to maximize their incomes as general equilibrium economic utility theory suggests. In terms of the economics of the fishing vessel as a firm, this would imply goals of maintaining a certain profit rate and an overall level of ex-vessel revenue, as well as maintaining employment opportunities.

[6]Meyer, P. A. 1987. Access control for the Northwestern Hawaiian Islands Bottomfishery." W. Pac. Reg. Fish. Manage. Counc. Rep., Honolulu.

[7]Only four vessels were active in the limited entry zone in 1993.

[8]Pooley, S. G., and K. E. Kawamoto. 1990. Economic analysis of bottomfish fishing vessels operating in the Northwestern Hawaiian Islands, 1984-88." NMFS Southwest Fish. Cent. Admin. Rep. H-90-13, 20 p.

[9]Hamilton, M. 1994. NWHI bottomfish fishery 1993 vessel activities, costs, and economic returns. NMFS Southwest Fish. Cent. Admin. Rep. H-94-1C, 36 p.

NWHI Lobster Fishery

The participants in the NWHI lobster fishery initially resisted appeals for limited entry or individual transferable quotas (ITQ's) in their fishery. They felt that high variable costs would reduce the risk of biological overfishing (i.e., that the fishery would regulate itself economically). Throughout the 1980's and into the 1990's, these participants have, on the whole, preferred a management structure which allowed risk-taking behavior: a jackpot approach to competition with their fellow participants instead of specified catch levels (e.g., set by ITQ's). An initial cost-earnings assessment conducted by NMFS economics and fishery monitoring staff (Clarke and Pooley, 1988) and a subsequent bioeconomic model (Clarke et al., 1992) suggested that the idea of economic self-management was not far-fetched in the sense that the open-access level of fleet operations was relatively close to the maximum sustainable yield level of operations.

However, with the rapid development of the Hawaii pelagic longline fishery (first for yellowfin and bigeye tuna and then for swordfish) in the late 1980's, the potential existed for longliners to participate in the NWHI lobster fishery on a seasonal basis. These longliners were hypothesized to be able to cover their variable costs without having to cover all of their fixed costs in the lobster fishery, providing a more continuous stream of income to their crews and owners. Combined with the first evidence of recruitment failure in the NWHI lobster stocks, this provided the incentive for NWHI lobster vessel captains and owners to craft their own limited entry program, codified by the Council in 1991.

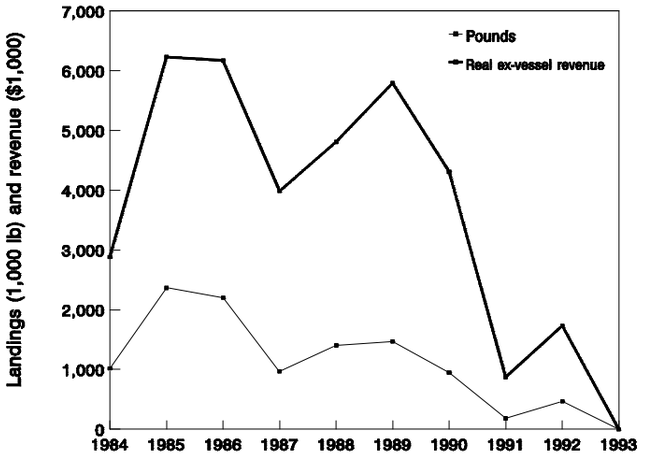

Figure 2
NWHI lobster landings and real ex-vessel revenues.

In contrast with the NWHI bottomfish program, the lobster program did include transferable permits, acknowledging the greater "commercialism" of the lobster fleet's owners. Fifteen vessels were vested with rights to NWHI lobster fishing permits, with approximately 12 vessels fishing on an annual basis. One feature of the bottomfish program was maintained, notably the requirement to use one's license at least once every two years. This provided exactly the kind of negative incentives that economic theory predicts: when catch rates dropped due to an unexpected decline in recruitment to the lobster stocks, some vessels were forced to continue fishing to maintain their permits (Townsend and Pooley[10]).

Hawaii's Domestic Longline Fishery

Finally, in 1991, the rapid growth of the domestic pelagic longline fishery in Hawaii, populated largely by new entrants from the U.S. east and Gulf coasts, encouraged some fishery managers and competing segments of the near-shore pelagic fishery (primarily small-scale commercial and recreational trollers and handliners, including charterboats) to call for a moratorium in the longline fishery. This moratorium lasted 3 years and in 1994 was transformed into a formal limited entry program with transferable permits.

The moratorium was designed to reduce competition between the longline fishery and the near-shore pelagic fisheries and to provide some conservation leeway in the blue marlin and swordfish fisheries, by reducing the bycatch of tuna and blue marlin. However, the regulatory impact analysis for the moratorium regulations found little empirical basis for the regulation and suggested that the potential costs to the longliners exceeded the benefits to the near-shore pelagic fisheries (Pooley, 1994). Economic dislocation occurred during the moratorium period when permits had only limited transferability. Nonetheless, as the

[10]Townsend, R. E., and S. G. Pooley. 1994. A proposal for corporate management of the Northwestern Hawaiian Islands lobster fishery. Pap. pres. at Am. Fish. Soc. annu. meet.

difficulties and costs in operating in Hawaii's distant-water pelagic longline fishery became more apparent to the new entrants, it also became apparent that the moratorium, and the subsequent limited entry program, provided a "controlled growth" environment. This would provide greater economic stability for the industry as a whole and make the implementation of biologically oriented fishery measures more amenable.

CONCLUSIONS

Limited entry has not been a panacea for any of the Hawaii Federally regulated commercial fisheries. As indicated by Figures 1 and 2, neither of the two NWHI fisheries has prospered in terms of maintaining total revenue from the fisheries. In neither fishery were the population dynamics well understood. Although maximum sustainable yield (MSY) figures were available for both fisheries, factors affecting these fish stocks were not well known. Thus for the lobster fishery, unexpected oceanographic perturbations substantially reduced population levels in the early 1990's, greatly reducing the scope of the commercial fishery (Polovina and Mitchum, 1992; Polovina et al., 1994). For the bottomfish fishery, the lack of detailed fishing information made assessment of annual variation in catch rates and fish sizes difficult as the participating vessels moved up the chain and explored new fishing grounds. In 1993, the lobster fishery was closed because of the stock recruitment problems, and landings in the bottomfish fishery had fallen by 50% from the peak in the mid 1980's.

However, as suggested by the estimated revenue per day fished (Figure 4), income has been more stable (while nonetheless quite variable). Moreover, the potential value of the permits has made rebuilding the NWHI fisheries economically viable, with a number of participants in the NWHI lobster fishery agreeing on multi-year closures if required. For the pelagic longline fishery, detailed empirical economic analysis is just beginning to reveal the dynamics of this industry.

Systems of limited entry are not known to achieve economic efficiency or to reduce fishery harvests in the presence of biological overfishing. Nonetheless, limited entry has its advantages, especially when compared to open-access fisheries and to the monitoring and enforcement costs of complex biological, economic, and operational regulations. This is particularly true if the limited entry program incorporates a simple system for reducing effort, e.g., fractional licensing (Townsend and Pooley, 1994)[11]. Despite what many might consider suboptimum economic performance in the two NWHI limited entry fisheries, and the ap-

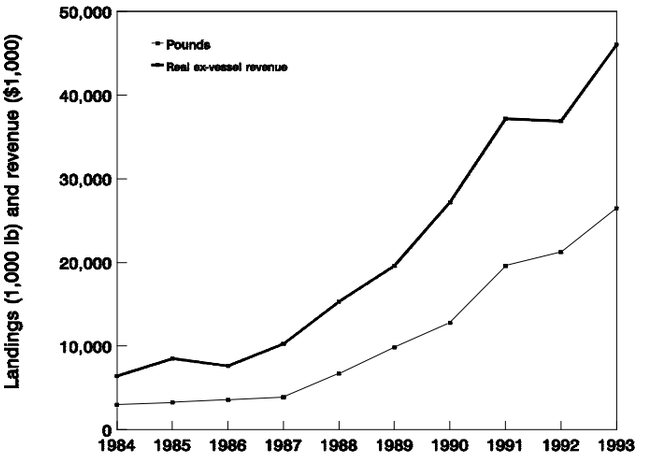

Figure 3
Hawaii longline landings and real ex-vessel revenues.

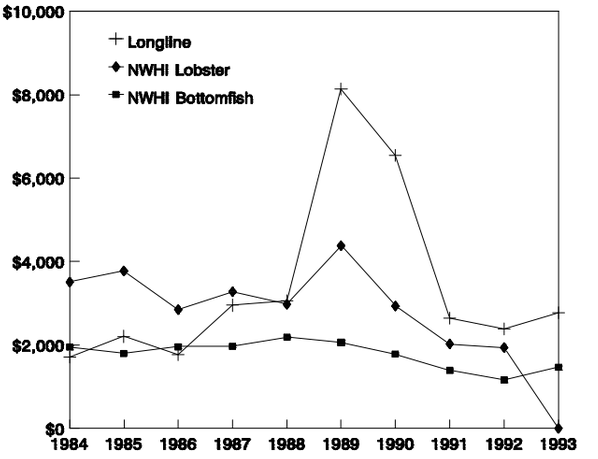

Figure 4
Hawaii commercial fisheries real daily revenue per vessel, by fishery.

[11]Fractional licensing is a system by which participation in a fishery is regulated by inputs (e.g., tradable fractions of permits) rather than outputs (e.g., ITQ's).

parently marginal economic benefits of limited entry in the longline fishery, the consensus in Hawaii is that the relatively early presence of limited entry developed a stronger sense of community in the fisheries and provided a better basis for working out subsequent fishery management problems. It is this latter point which is perhaps generalizable to the more established fisheries on the U.S. mainland.

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